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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,507	06/23/2006	Giulia Pietra	10880.0399	4568
22852	7590	01/23/2009		
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413			EXAMINER KING, JOSHUA	
			ART UNIT 2828	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/584,507

**Applicant(s)**

PIETRA ET AL.

**Examiner**

JOSHUA KING

**Art Unit**

2828

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16-35 is/are pending in the application.
- 4a) Of the above claim(s) 22-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-21 and 31-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/06)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Paper No(s)/Mail Date \_\_\_\_\_
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/17/2008 has been entered.

### ***Response to Arguments***

2. Applicant's arguments filed 10/17/2008 have been fully considered but they are not persuasive.

3. Beginning on page 9 of the response, applicants argue that Rosenblatt and Sonehara fail to teach each and every element of Applicants' claimed invention. Specifically, that Rosenblatt and Sonehara do not disclose "an external cavity configured to propagate a plurality of cavity modes" and "a light transmissive material having a selectively variable refractive index to permit wavelength tuning of the filter, said light transmissive material...configured to form a tunable cladding layer to change a resonant wavelength of the planar waveguide).

4. To support applicants claim regarding the plurality of cavity modes, applicant cites column 3 lines 17-26 and column 15 lines 45-46. First it is noted that applicant recites "an external cavity configured to propagate a plurality of cavity modes". Applicant does not claim the number of modes which propagate in the filter.

Furthermore, "configured to propagate a plurality of cavity modes" is merely intended use of the external cavity and Rosenblatt discloses that such a configuration is possible (see Abstract lines 7-8). Also, column 15 lines 45-55 of Rosenblatt describe the coupling of a single mode from a group of modes propagating in the cavity into the filter. The cavity being the area between the filter and the laser diode. Therefore, at least the external cavity of Rosenblatt is "configured to propagate a plurality of cavity modes".

5. To support applicants claim regarding the light transmissive material configured to change a resonant wavelength of the planar waveguide applicant cites column 3 lines 4-6, column 4 lines 40-48, column 7 lines 27-32 and the Abstract. Applicant claims Rosenblatt teaches away from the claim language because the refractive index of his device for the "presence or absence" of resonance for a preselected wavelength. Applicant ignores column 8 lines 15-22, which states, "Changing the index of refraction changes the resonant wavelength. Rapid tuning of the device resonance wavelength provides prompt modulation of the incident beam 11 which is readily transmitted through the device for resonance wavelengths other than the wavelength of the incident radiation and emerges as modulated beam 63." It is unclear how Rosenblatt can teach away from a limitation while explicitly reciting said limitation in the disclosure of Rosenblatt's invention. This limitation is also explicitly recited in Sonehara see "constitution".

6. All other arguments were based on the idea that Rosenblatt in view of Sonehara were lacking these features. Since, these features have been taught in Rosenblatt all other arguments are moot.

***Election/Restrictions***

7. Claims 22-30 are still withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on July 31, 2007.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 16-17, 21, and 31- 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenblatt (U.S. Patent Number 5,337,183) in view of Sonehara (JP Publication Number 63-244004).

11. **With respect to claim 16**, Rosenblatt discloses an external-cavity tunable laser system configured to emit radiation at a laser emission wavelength (Fig. 5 element 50), comprising an external cavity having a plurality of cavity modes, said external cavity comprising (column 15 lines 45-55): a gain medium to emit an optical beam into the external cavity (Fig. 5 element 11); and a tunable optical resonant grating filter reflecting the optical beam at a resonant wavelength, said filter comprising (Fig. 5 element 50): a diffraction grating (Fig. 5 element 56); a planar waveguide optically interacting with said diffraction grating (Fig. 5 element 59 and column 2 lines 40-42 and column 8 line 63), the diffraction grating and the planar waveguide forming a resonant structure (column 9 lines 6-22). Rosenblatt does not explicitly disclose a light transmissive material having a selectively variable refractive index to permit tuning of the filter said light transmissive material comprising a liquid crystal material so as to form a tunable cladding layer for the planar waveguide, wherein the planar waveguide is placed between the diffraction grating and the tunable cladding layer. However, Sonehara discloses a light transmissive material having a selectively variable refractive index to permit wavelength tuning of the filter (constitution lines 11-12), said light transmissive material comprising a liquid crystal material configured to form a tunable cladding layer to change a resonant wavelength of the planar waveguide (Fig. 1 elements 103 see also constitution line 3), wherein the planar waveguide is placed between the diffraction grating and tunable cladding layer (Fig. 1 elements 103, 101, and 104). The advantage is to allow for control of the coupling of light (constitution 6-12).

12. **With respect to claim 17**, Rosenblatt further discloses the emitted radiation is on a single longitudinal mode (Fig. 5 element 63).
13. **With respect to claim 21**, Rosenblatt further discloses the tunable resonant grating filter is arranged in the external cavity so that the optical beam impinges on the filter substantially perpendicular to a main surface of the planar waveguide (Fig. 5 element 11).
14. **With respect to claim 31**, Sonehara further discloses the selectively variable refractive index of the liquid crystal material is controlled by an electric signal (constitution lines 6-12).
15. **With respect to claim 32**, Sonehara further discloses two light transparent electrically conducting layers arranged on opposite sides of the light transmissive material for applying the electric signal across the light transmissive material (Fig. 1 elements 105 and 101). It is clear from the figure that elements 101 and 105 must both be light transparent and conduct electricity for the device of Sonehara to work.
16. **With respect to claim 33**, Rosenblatt in view of Sonehara does not explicitly disclose the tunable optical resonant grating filter exhibits a tunability within a tuning range of at least 10 nm. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a large tuning range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It should

be stated that a large tuning range is understood in the art to be beneficial, as it increases the flexibility of uses for the laser.

17. **With respect to claim 34**, Rosenblatt discloses an external-cavity tunable laser system configured to emit radiation at a laser emission wavelength (Fig. 5 element 50), comprising an external cavity having a plurality of cavity modes, said external cavity comprising (column 8 lines 55-56): a gain medium to emit an optical beam into the external cavity (Fig. 5 element 11); and a tunable optical resonant grating filter reflecting the optical beam at a resonant wavelength, said filter comprising (Fig. 5 element 50): a diffraction grating (Fig. 5 element 56); a planar waveguide optically interacting with said diffraction grating (Fig. 5 element 59 and column 2 lines 40-42 and column 8 line 63), the diffraction grating and the planar waveguide forming a resonant structure (column 9 lines 6-22). Rosenblatt does not explicitly disclose a light transmissive material having a selectively variable refractive index to permit tuning of the filter said light transmissive material comprising a thermo-optical material having a thermo-optic coefficient of  $dn/dT$  of not less than  $10^{-4}/^{\circ}\text{C}$  so as to form a tunable cladding layer for the planar waveguide, wherein the planar waveguide is placed between the diffraction grating and the tunable cladding layer. However, Sonehara discloses a light transmissive material having a selectively variable refractive index to permit tuning of the filter (constitution lines 11-12), said light transmissive material comprising a thermo-optical material having a thermo-optic coefficient of  $dn/dT$  of not less than  $10^{-4}/^{\circ}\text{C}$  so as to form a tunable cladding layer for the planar waveguide (Fig. 1 elements 103 see also constitution line 3 and page 14 table 1), wherein the planar waveguide is placed between the diffraction

grating and tunable cladding layer (Fig. 1 elements 103, 101, and 104). The advantage is to allow for control of the coupling of light (constitution 6-12). It should be noted that page 14 Table 1 discloses the liquid crystal to be MBBA. MBBA is a nematic liquid crystal. Nematic liquid crystals are known in the art to have especially high thermo-optic coefficients. Please see Ogusu et al. "Nonlinear Fiber Fabry-Perot Resonator Using Thermo-Optic Effect" page 1780 discloses MBBA to have a  $dn/dT$  of  $3 \times 10^{-4} \text{ K}^{-1}$ . Using unit analysis it is clear that  $3 \times 10^{-4} \text{ K}^{-1}$  is equivalent to  $3 \times 10^{-4} \text{ }^{\circ}\text{C}^{-1}$ . So while MBBA is generally considered an electro-optical material, it also is a thermo-optical material as the claim is written. In the interest of compact prosecution, the examiner has also provided Sidorin et al. (U.S. Pre-Grant Publication 2003/0214700) cited below which explicitly discloses that a person of ordinary skill in the art would easily recognize using either thermo or electro optical materials for granting refractive index control ([0206]).

18. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device disclosed by Rosenblatt with the liquid crystal cladding layer as disclosed by Sonehara in order to provide for control of the coupling of light.

19. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenblatt (U.S. Patent Number 5,337,183) in view of Sonehara (JP Publication Number 63-244004) as applied to claim 16 above, and further in view of Tuganov et al. (U.S. Pre-Grant Publication 2003/0012237).

20. **With respect to claim 18**, Rosenblatt in view of Sonehara does not explicitly disclose further comprising a channel- allocation grid element arranged in the external

Art Unit: 2828

cavity to define a plurality of pass bands substantially aligned with corresponding channels of a selected wavelength grid. However, Tuganov et al. discloses further comprising a channel- allocation grid element arranged in the external cavity to define a plurality of pass bands substantially aligned with corresponding channels of a selected wavelength grid ([0006]). The advantage is to allow the device to be used in optical communication devices ([0001]).

21. **With respect to claim 19**, Rosenblatt further discloses the distributed resonant cavity light beam modulator used for optical addressing (column 12 line 53).

22. **With respect to claim 20**, Rosenblatt in view of Sonehara does not explicitly disclose wherein the selected wavelength grid has a channel spacing of 50 GHz or 25 GHz. However, Tuganov et al. discloses wherein the selected wavelength grid has a channel spacing of 50 GHz or 25 GHz ([0001]).

23. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the device disclosed by Rosenblatt in view of Sonehara with the channel-allocation grid as disclosed by Tuganov et al. in order to allow the device to be used in optical communication devices.

24. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenblatt (U.S. Patent Number 5,337,183) in view of Sonehara (JP Publication Number 63-244004) as applied to claim 16 above, and further in view of Sidorin et al. (U.S. Pre-Grant Publication 2003/0214700).

25. **With respect to claim 35**, Rosenblatt in view of Sonehara do not explicitly disclose the thermo-optic material is a polymer. However, Sidorin et al. discloses

thermo-optic polymers are known in the art to be useable in devices where refractive index control is needed ([0031]). Sidorin et al. also discloses the substitution of electro-optic materials for thermo-optic materials and vice-versa is known in the art ([0206]). It should be noted that the material disclosed by Sanehara can still be considered a thermo-optic material. However, the examiner does not believe it is proper to call it a thermo-optic polymer.

26. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a thermo-optic polymer, since Sidorin et al. discloses that a person of ordinary skill in the art would recognize them as equivalents for the controlling the refractive index. Therefor, the art would have found it obvious to substitute MBBA for a thermo-optic polymer.

### ***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cavanaugh et al. (U.S. Patent Number 7,009,680) see Fig. 2. Wang (U.S. Patent Number 7,013,064) see Fig. 1. Revelli, Jr. et al. (U.S. Patent Number 5,347,377) see Fig. 2. Steffens et al. (U.S. Pre-Grant Publication 2003/0048817) see Fig. 4.

22. **Koyama et al. (U.S. Patent Number 7,343,064) see Fig. 2. While Koyama et al. does not constitute prior art it is considered extremely relevant to applicants disclosure.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA KING whose telephone number is (571)270-

Art Unit: 2828

1441. The examiner can normally be reached on Mon.-Thurs. 10:00-7:30 and other Fri. 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joshua King/  
Examiner, Art Unit 2828  
01/21/2009

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